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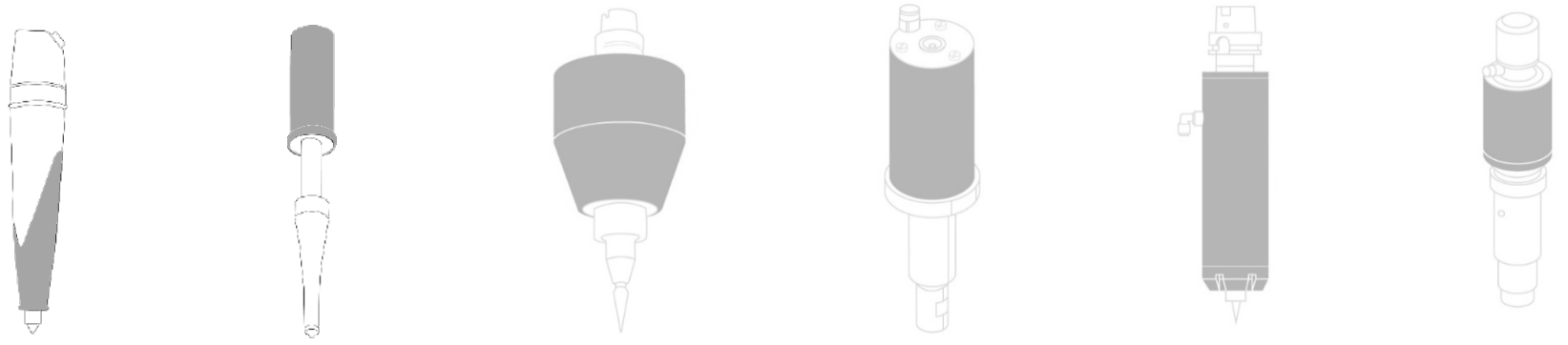
Cutting and Welding Solutions

Cutting and welding solutions for industry



Portative and automated solutions for ultrasonic cutting and welding of composites materials

Summary

ULTRASONIC CUTTING SOLUTIONS

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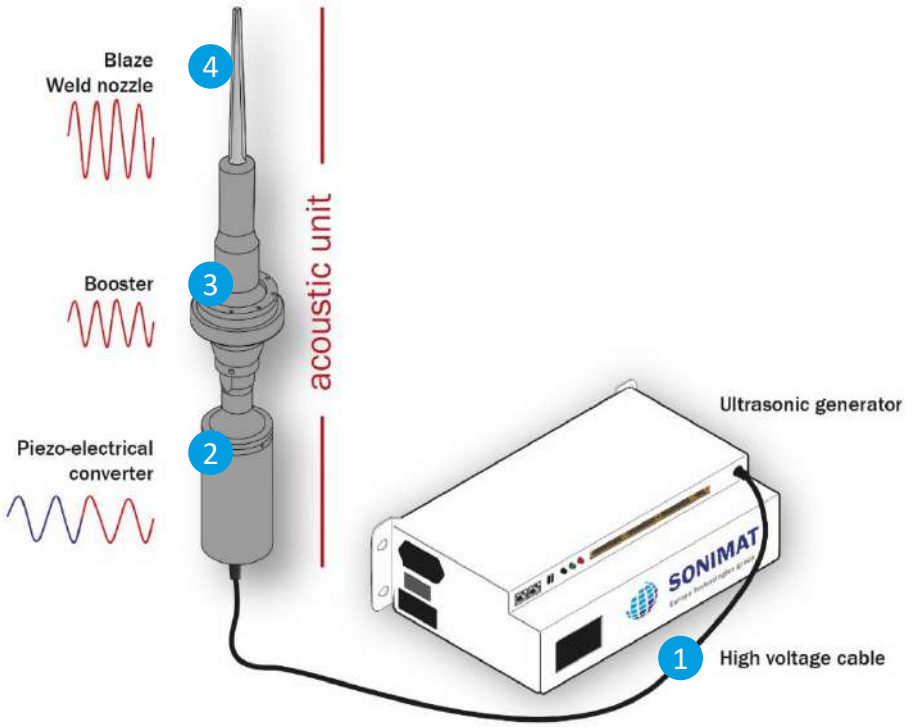
Ultrasonic Technology



1. Ultrasonic emission
2. Electrical signal converted into mechanical energy
3. Increase of the vibration amplitude through the booster
4. Tool vibration for cutting and welding (20Khz to 40Khz)

A solution for each application

1

Portative Equipment

2

End-effectors embeddable on machines

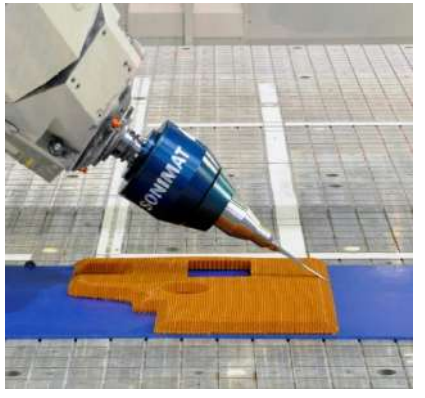
3

Customized machines dedicated to customer's need

Ultrasonic cutting solutions | *Technology advantages*

Reducing cutting effort

- No grip on tool
- Embeddable solutions
- Easy handling and set-up



Increasing productivity

- Reduced maintenance
- Cutting velocity increased
- Cutting until 125mm thickness
- Continuous work
- Extended blade life cycle

Improving cutting quality

- No thermal degradation
- No fraying
- No dust

ULTRASONIC CUTTING PORTABLE SOLUTION

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SSP-Portative equipment for ultrasonic cutting

FEATURES

- Ultrasonic generator
- Quick blade change
- 3/5m ultrasonic coaxial wire
- Automatic frequency (~ 20KHz)

RAW MATERIALS

- Dry fibers
- Prepregs
- Honeycomb / Core materials
- Elastomer

600W
Maximum power

230V
50Hz-mono 16A
Power Supply

20 000
Vibrations/second

NB: Ultrasonic welding is possible by simply changing the handle

SSP-Portative equipment for ultrasonic cutting | *Blades range*

Depending of the blade's lenght, two different handles are available

35mm 25mm 15mm 10mm 8mm Single layer 4mm

Large blade handle

Small blade handle

Ultrasonic cutting - portable solution | *fibers applications*

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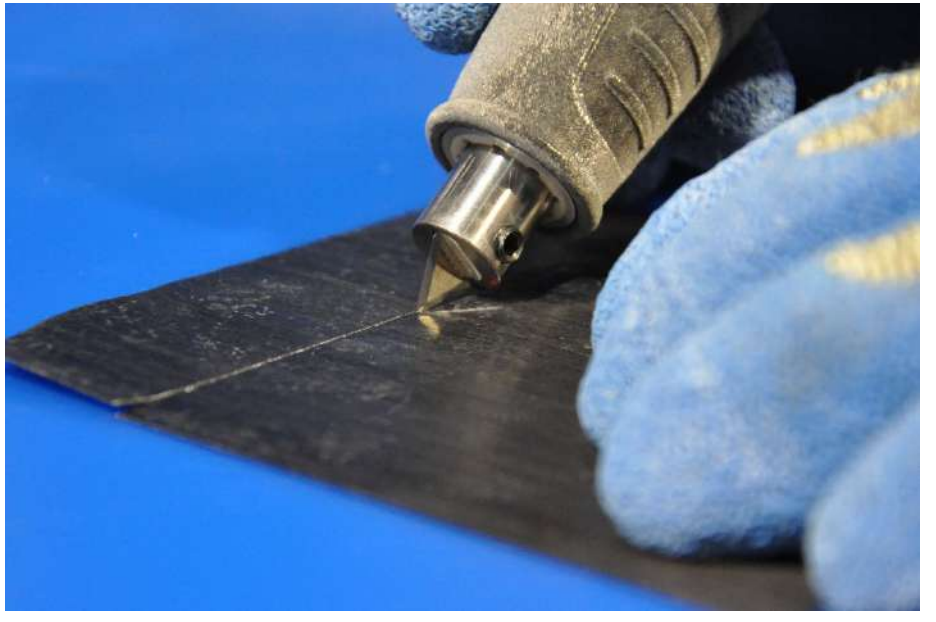
Dry fibers application

- **Blade**: single layer

Thermoplastic carbon fiber



- **Blade**: 8mm

Ultrasonic cutting - portable solution | *Honeycomb applications*

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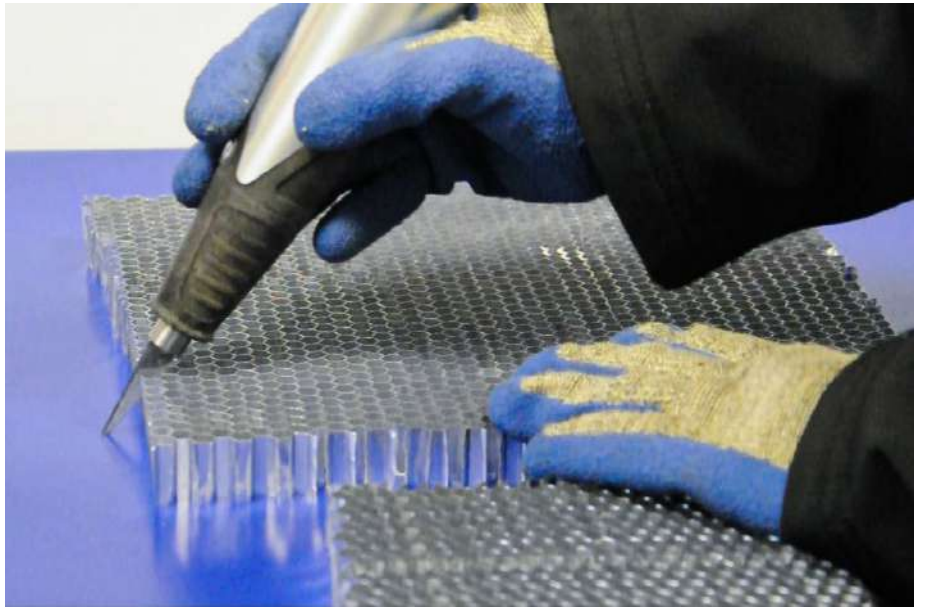
Honeycomb NOMEX

- **Blade**: 25mm
- **Material thickness**: 20mm

Honeycomb Aluminum



- **Blade**: 35mm
- **Material thickness**: 20mm

ULTRASONIC CUTTING END-EFFECTORS

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Ultrasonic cutting End-Effectors | *Range of products*

SONIBLADE L

- CNC machines/robots
- Honeycomb cutting and surface machining
- Thickness up to 125 mm

SONIBLADE M

- CNC machines/robots
- Composites cutting
- Thickness up to 35 mm

SONIBLADE S

- ATL/AFP machines and Robots
- Composites cutting
- Thickness up to 2 mm

SONIBLADE T

- XY cutting tables
- Composites/ Elastomer cutting
- Thickness up to 15 mm

SONIBLADE L | *Robots / CNC Machines*

FEATURES

- **End-Effector adjustable** for each type of robots/CNC machines
- **Ultrasonic generator**: 20KHz
- Up to 15m of ultrasonic coaxial wire
- **Automated Cooling** of the ultrasonic components
- No risk for the spindle health
- Suitable for blade and disc

RAW MATERIALS

- Honeycomb:
  - Nomex
  - Kevlar
  - Aluminum
  - Composite
  - Foam

Attachment HSK MORSE or BT
Comutable cones depending on customer request

Length: 375mm

Slip ring:
Up to 1000 RPM

Easy mounting of the blade or disc

SONIBLADE L | *Ultrasonic & Pneumatic connections*

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Manual Connection

Needing a plate in order to avoid the rotation
Manual clamping of ultrasonic and pneumatic cables

Automated Connection

Allowing the customer to automatically connect ultrasonic and pneumatic cables and adjust ultrasonic parameters by encoding

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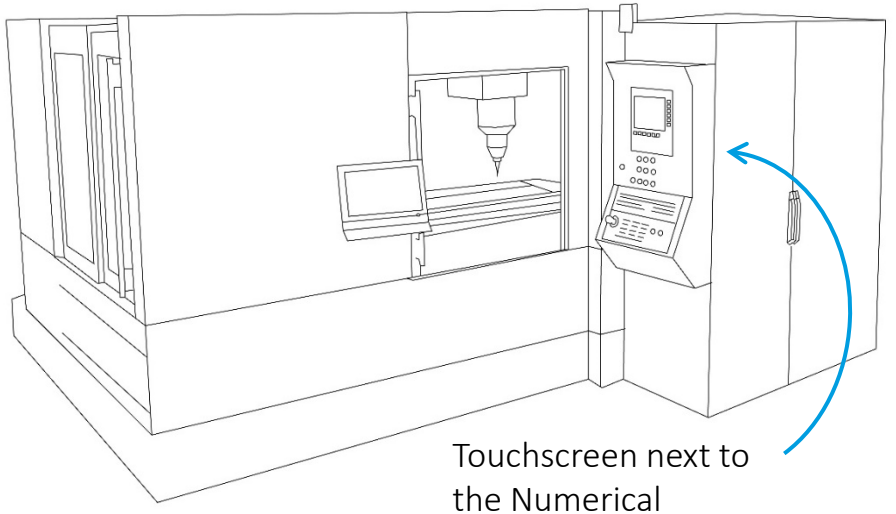
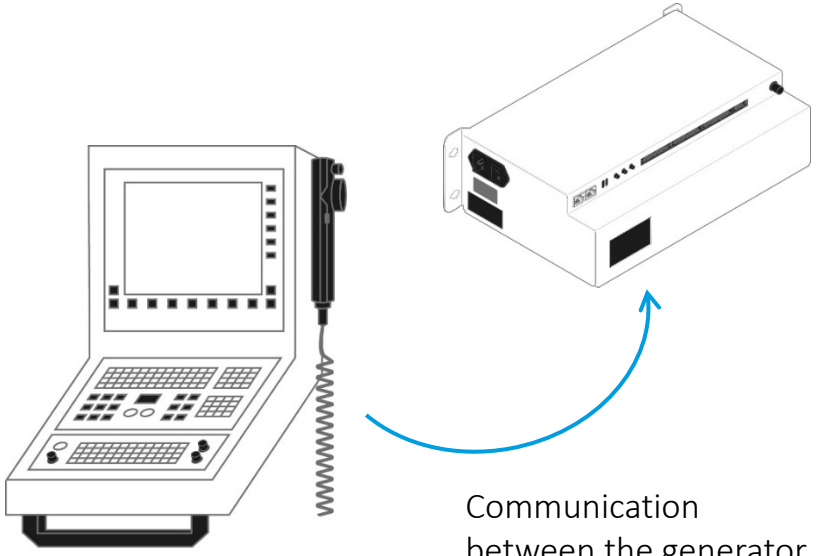
Communication with the Ultrasonic Generator



Touchscreen next to the Numerical Controller of the machine



Communication between the generator and the Numerical Controller

NB: this option is also valid for our entire SONIBLADE range

SONIBLADE L | *Blades range*

125mm 80mm 78mm 50mm 40mm 30mm

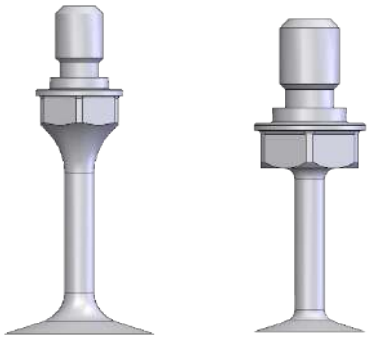
Customized blade can be developped for your specific needs

SONIBLADE L | *Discs range*

Disc

Ø63mm Ø50mm Ø18,3mm

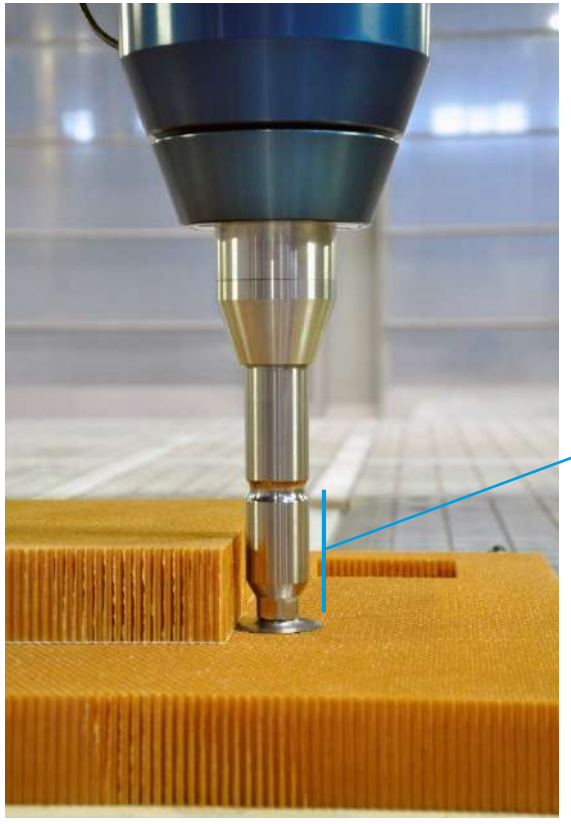
Extended disc



Ø25mm Ø15mm

Customized disc can be developped for your specific needs

SONIBLADE L | Longer sonotrode



Option

Longer sonotrode for surface machining

- Increasing the length of the sonotrode by 125mm
- Objective: to be able to access complex geometrical areas (curved and layered parts...)

Available for the SONIBLADE L disc and blade range

SONIBLADE L | *Robot applications*

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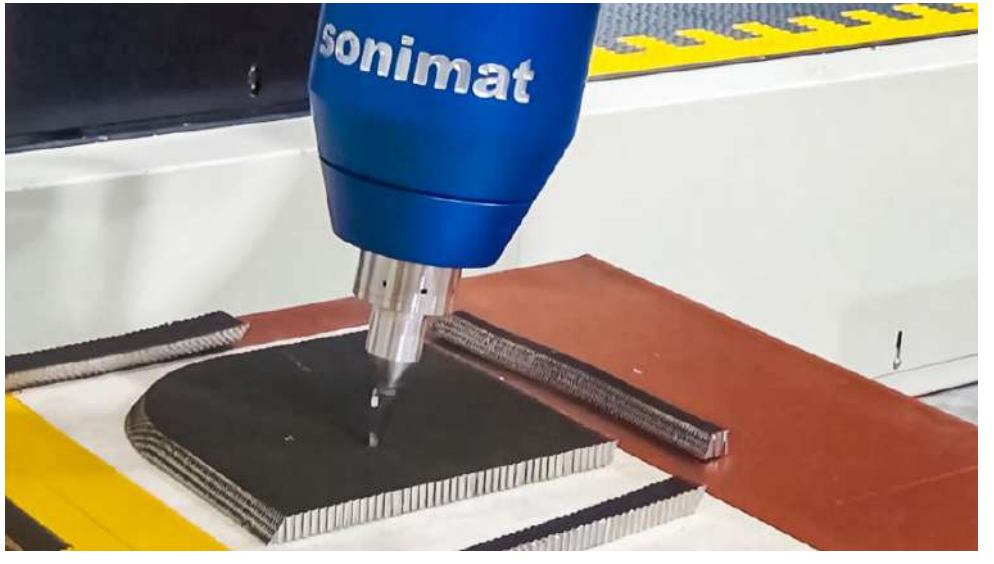
Honeycomb NOMEX

- **Disc**: Ø63mm
- **Material thickness**: 30mm

Honeycomb Aluminum



- **Blade**: 50mm
- **Material thickness**: 30mm

SONIBLADE L | *CNC applications*

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NOMEX Honeycomb

- **Blade**: 50mm

NOMEX Honeycomb

- **Blade**: 125mm
- **Material thickness**: 70mm

SONIBLADE M | *Robots / CNC Machines*

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FEATURES

- **End-Effector adjustable** for each type of robots / CNC machines
- **Cutting speed** limited to the mechanical properties of the machine
- **Ultrasonic generator** : 20KHz
- Up to 15m of ultrasonic coaxial wire
- **Automated Cooling** of the ultrasonic components
- Possibility to integrate the automated connection
- Possibility to integrate mechanical clamping for robot

RAW MATERIALS

- Dry fibers
- Prepregs
- Elastomer
- Honeycomb

Robot attachement | HSK63A | Central ring

Attachment
Comutable cones depending on customer request

Indexed blades
Always mounted in the same position

Length:
348 mm

SONIBLADE M | *Robots / CNC Machines*

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Rotating collector

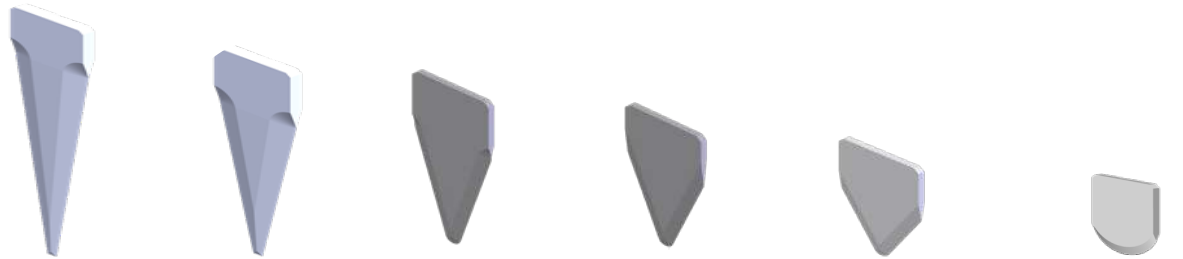
Avoiding cable's distortion

Automated Connection

Allowing the customer to automatically connect ultrasonic and pneumatic cables

Manual Connection

SONIBLADE M | *Blades range*



35mm 25mm 15mm 10mm 8mm Single layer 4mm

Customized blade can be developped for your specific needs

SONIBLADE M | *Applications*

Set up of a SONIBLADE M effector on a 5-axis machining machine

Cutting of preformed carbon prepreg - 4mm thickness

SONIBLADE T | *XY Cutting Tables*

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FEATURES

- **End-Effector adjustable** for each type of XY Cutting tables
- **Ultrasonic generator**: 30KHz
- Up to 15m of ultrasonic coaxial wire
- **Automated Cooling** of the ultrasonic components
- **Cutting speed** limited to the mechanical properties of the machine (until 50/70 m/mn)

RAW MATERIALS

- Dry fibers
- Prepregs
- Honeycomb / Core materials
- Elastomer

Slip Ring
In order to avoid cable distortion

Attachment Area Ø 40 mm

Indexed blades
Always mounted in the same position

Length:
350 mm

SONIBLADE T | *Blades range*

15mm

10mm

8mm

Single layer
4mm

Customized blade can be developped for your specific needs

SONIBLADE T | *Table applications*

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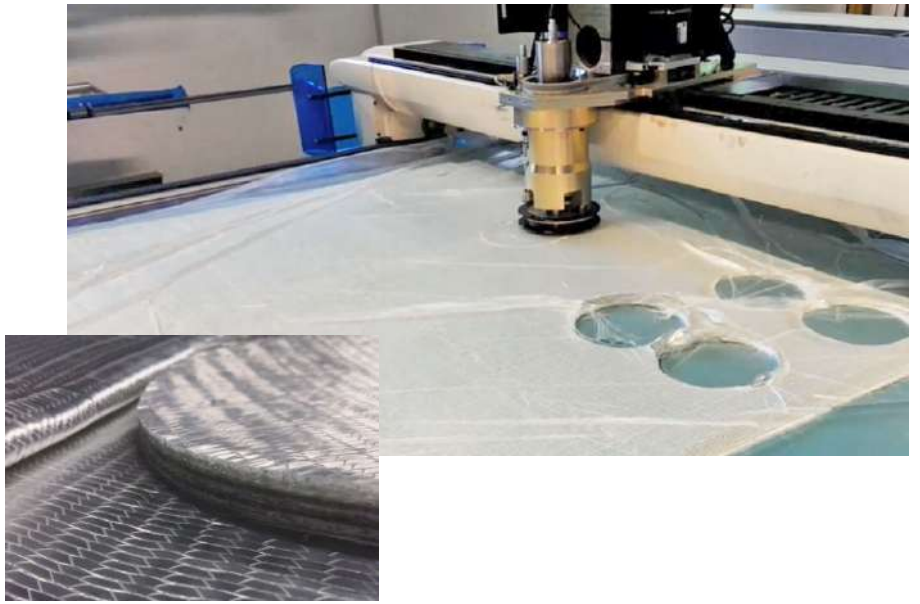
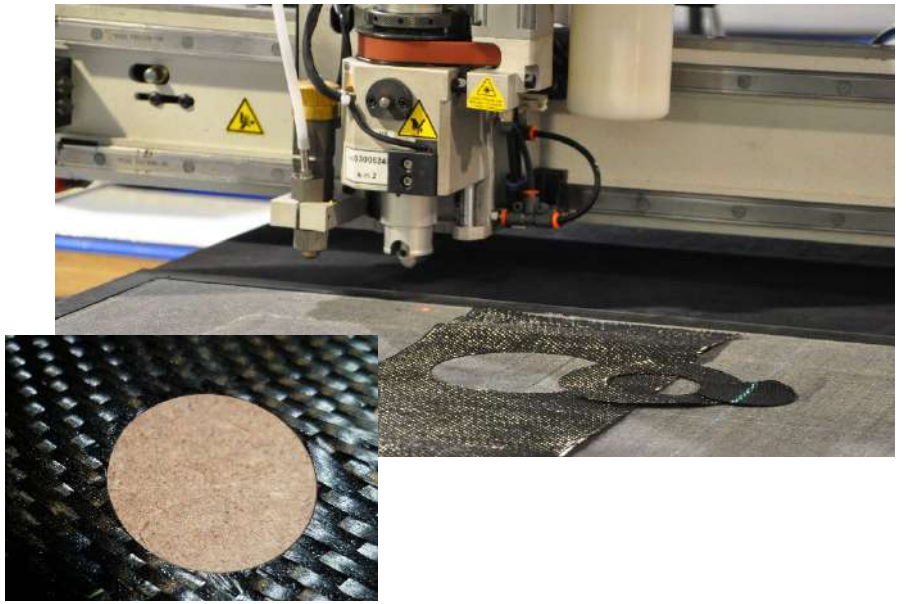
Glass Fiber – 8 layers – 50m/min – 30 kHz



Carbon Fiber – 1 layer 50m/min – 30 kHz



SONIBLADE S | *XY Cutting Tables / Robots*

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FEATURES

- **End-Effector dedicated** for ATL/AFP machines and robots
- **Ultrasonic generator**: 40KHz
- Up to 15m of ultrasonic coaxial wire
- **Automated Cooling** of the ultrasonic components
- Maximum cutting thickness: 2mm
- Easily integrated on the machine: reduced end-effector size
- **The most compact ultrasonic device on the market**

RAW MATERIALS

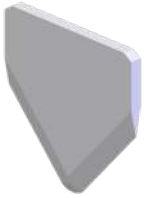
- Dry fibers
- Prepregs

Mechanical clamping area:
machine/effector interface

Indexed blades
Always mounted in the same position

Length:
160mm

SONIBLADE S | *Blades range*



8mm

Single layer

4mm

Customized blade can be developped for your specific needs

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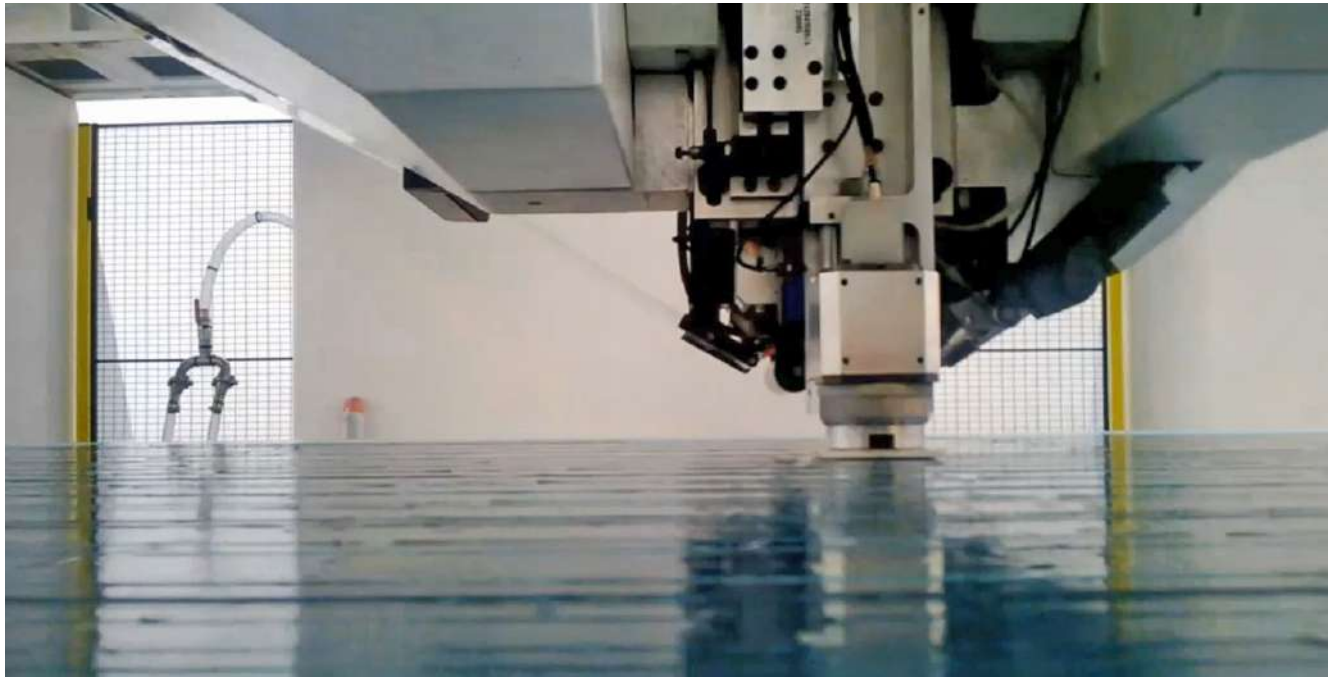
Integration of a SONIBLADE S effector



COMPOSITE WELDING SOLUTIONS

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A solution for each application

1

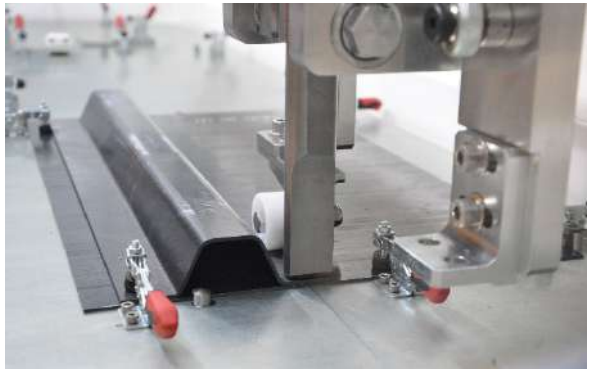
Portative Equipment

2

Standard equipment
Press ESW

3

Customized machines dedicated to customer's needs



SSP-Portative equipment for ultrasonic welding

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FEATURES

- Ultrasonic generator
- 3/5m ultrasonic coaxial wire
- Automatic frequency (~ 20 up to 40KHz)
- Management of the welding time by the generator
- Dedicated to spot welding

RAW MATERIALS

- Thermoplastic composite:
  - Prepreg fabrics: powders, films, co-mingles,
  - Consolidated plates, ribbons,
  - Matrices: PA, PEI, PEEK, PEKK, PPS...

Titanium horn

Commutable nozzles

Welding cycle management

- Transferred energy management
- Welding time management
- Range tuning

NB: handle is adaptable on the SSP-cutting

SSP-Portative equipment for ultrasonic welding | Nozzles

Commutable nozzles

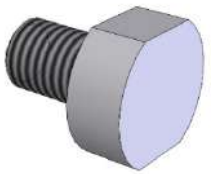
Staking nozzle

Conical nozzle (F1)

Radial nozzle (F2)

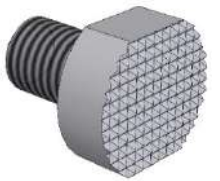
Nozzle with steps (A1)

Nozzle with steps (A2)



Flat nozzle (B)

Diamond dots nozzle 1.0mm (B1)



Diamond dots nozzle 1.0mm (B2)

Portable ultrasonic welding | *Applications*

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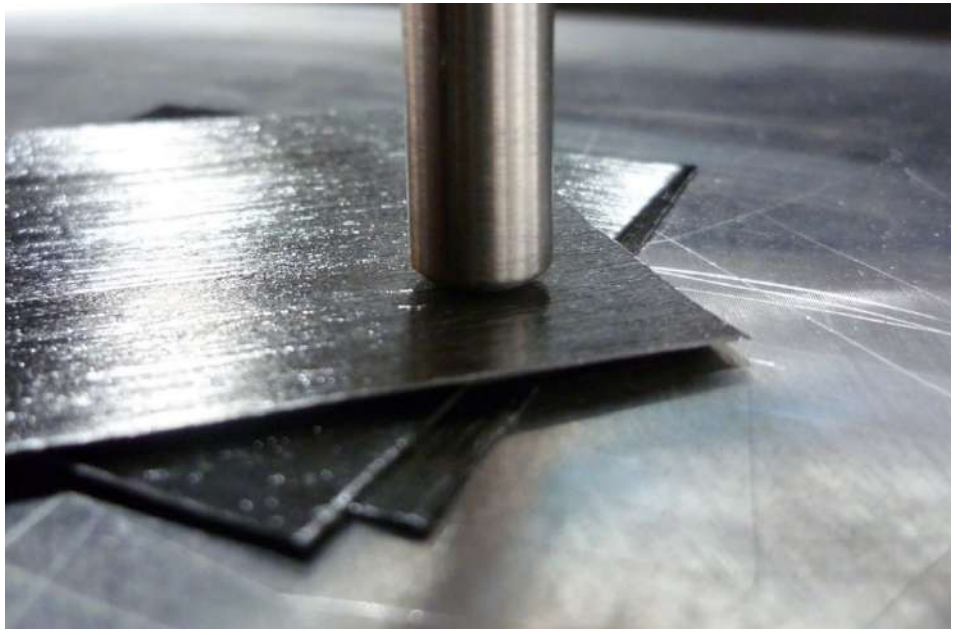
- Welding of consolidated layer in PA glass wire

- Ultrasonic prepositioning of TP carbon peek layer



Ultrasonic Welding Solution | ESW

MADE IN FRANCE

Design, manufactured and controlled in our workshop.

MACHINE FEATURES

- Two-handed control for operator safety
- Rapid change of the resonance stack
- Interchangeable and upgradable ultrasonic generator
- Strong structure rigidity
- Tripod tuning of the flatness
- Multiples configurations

COLORED TOUCH SCREEN INTERFACE FEATURES

- User-friendly programming
- Operating modes : constant speed or stress
- Welding stop : stop time, energy

OPTIONS

Rotating tray, Soundproof workstation, Multi-head and Film unwinder system

ESW press

ESW press with frame

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Ultrasonic Welding Solution | *Technology advantages*

High frequency vibrations are provided to the part in contact with the sonotrode. The heat generated at the interface of the two parts creates the weld.

APPLICATIONS

Thermoplastic welding for small and medium parts

- Amorphous thermoplastic
- Thermoformed part

ADVANTAGES

- **Excellent repeatability:** +/- 0,02mm
- **Quick welding:** inferior to 1 sec
- Without extra material recovery
- **Traceability:** Production data recording
- **High precision**

Materials the most commonly used: ABS, ABS-PC , PC, PA6, PA66, PMMA, PP, PS, PEEK, PEKK, HELIUM

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CUSTOMIZED MACHINES | for composite cutting & welding

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THINK CUSTOMIZED !

We have been recognized for more than 25 years for our welding, cutting and composite materials processing solutions. Proud of this recognition, we also offer our customers the design and manufacture of customized machines with our cutting and welding processes: ultrasonic cutting and welding / laser - infrared - spin welding – hot plate.

ADVANTAGES:

- Proven and reliable cutting and welding processes
- Turnkey customized solutions
- The right answer to high speed rates and/or process repeatability
- Possible robotics integration
- Commissioning, training, technical assistance and maintenance by our teams

CUSTOMIZED MACHINES | for composite cutting & welding

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- Customized machine for cutting thermoset composites

- Customized machine for welding of thermoplastic composites

WELDING SOLUTIONS

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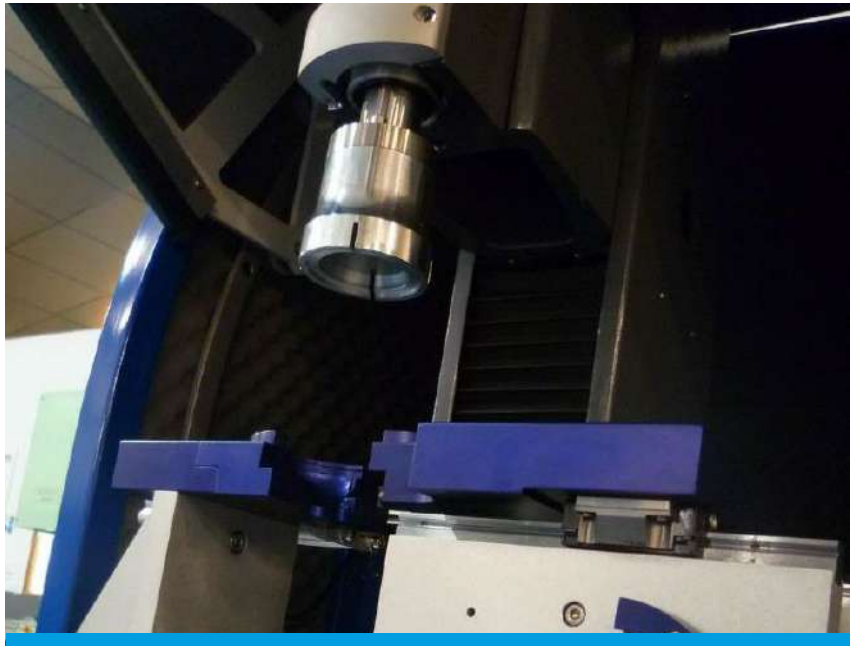
Spin Welding



The welding is made by rotating the upper part of the assembly, and simultaneously applying a compressive force.

APPLICATIONS

Thermoplastic welding for small and medium revolution parts
(Ex: air system, vase, jar)

ADVANTAGES

Quality

- Excellent repeatability
- High precision / High linearity of the pressure
- Waterproof
- Strong mechanical resistance

Productivity

- Few influence of external parameters

Materials the most commonly used: POM, PPA PE, PP, PS, PBT, ABS, PA66, PA6, PEEK…

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Spin Welding | RSW

Design, manufacturing and control in our workshop

MACHINE FEATURES

- Opened frame for small and wide parts
- Column available alone
- High mechanical accuracy +/-0,02mm
- Mobile protection door
- Integrated tooling management

INTERFACE FEATURES

- User-friendly programming
- Welding curves display
- Recording of all data production

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Hote plate Welding

The upper and lower sides of the part are pushed towards the hot plate in order to transfer the heat energy, then separated and compressed for assembly.

APPLICATIONS

Thermoplastics welding for large parts with complex shape, smooth material and technical assembly

(Ex: waterproof part, Dashboard, Electronic control unit…)

ADVANTAGES

Process

- Process traceability and repeatability
- Automatic recognition of tooling
- Optimized time control for weld line
- Forces, speed and position controls

Product

- Aesthetic
- Strong mechanical resistance
- Waterproof
- High linearity of the pressure

Materials the most commonly used :
PE, POM, PP

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Infrared Welding

The upper and lower sides of the part are pushed closed to the hot plate in order to transfer the heat energy, then removed and compressed for assembly.

APPLICATIONS

Thermoplastics welding for large parts with complex shape (2D/3D), smooth material and technical assembly
(Ex: full beam, tank, filter, hose…)

ADVANTAGES

Process

- Weld without blade fouling
- No color alteration
- Low energy consumption

Product

- Aesthetic
- Strong mechanical resistance
- Waterproof
- High linearity of the pressure

Materials the most commonly used :
Tous PA, PBT, PPA, PPS, PP, PET PEEK

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Infrared and Hot Plat Welding | HPW

MACHINE FEATURES

- SONIMAT's hook mode
- Electrically driven press ramp up
- Operator safety with light curtain
- Automated recognition of the toolings

PROCESS FEATURES

- Traceability
- Repeatability
- Auto-tuning warning (control of coordination)
- Forces, speed and positions control

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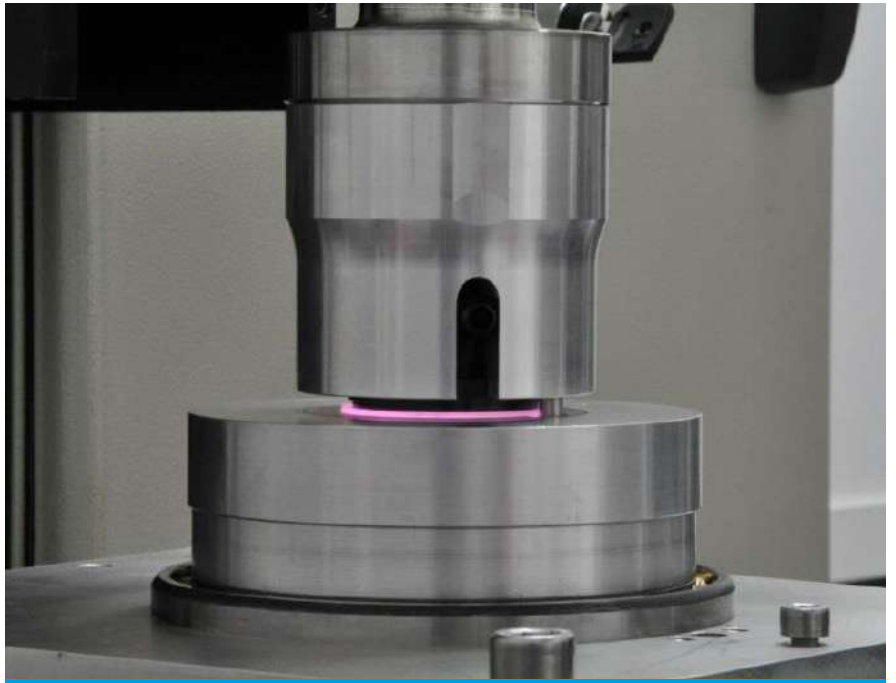
Laser Welding



The laser welding is performed by the beam dissimination through the upper side of the part while the lower side of the part absorbs it to create the welding between both sides.

APPLICATIONS

Thermoplastic welding for small and medium parts *(Ex: dashboard, magnifying glass)*

ADVANTAGES

Process

- Compact tooling
- Reliable and strong process
- No alteration
- Repeatability +/- 0,02mm

Product

- No design restriction
- Aesthetic
- Strong mechanical resistance
- Waterproof
- Perfect control of the penetration distance

Materials the most commonly used : PC, PA, PP, PS, PEEK, PMMA, POM, PBT, TPU, PE

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Laser Welding | LSW

MACHINE FEATURES

- Electrical driven press ramp up
- Upgraded and interchangeable generator
- Operator safety with light curtain
- Automatic recognition of the toolings
- Path programming (DXF)

PROCESS FEATURES

- Laser Power up to 200W
- Traceability
- Repeatability
- Perfect control of the penetration distance

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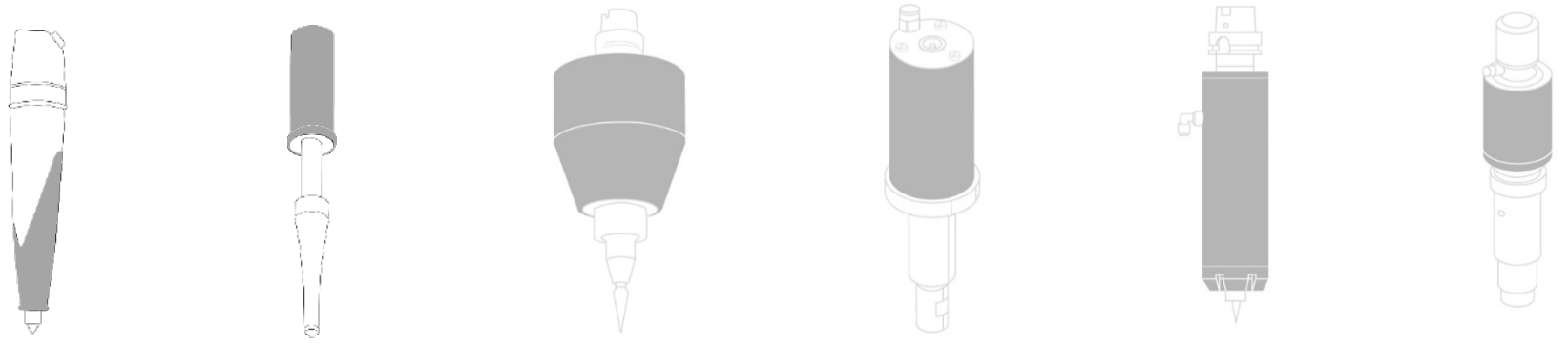

Portative and automated solutions for ultrasonic cutting and welding of composites materials

EUROPE TECHNOLOGIES
SONIMAT

Our facilities

Welding and cutting: Composite - Food industry - Packaging - Non woven

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